

BURMA <sup>cat</sup>

amber + jade

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NOETLING





1892  
Cat



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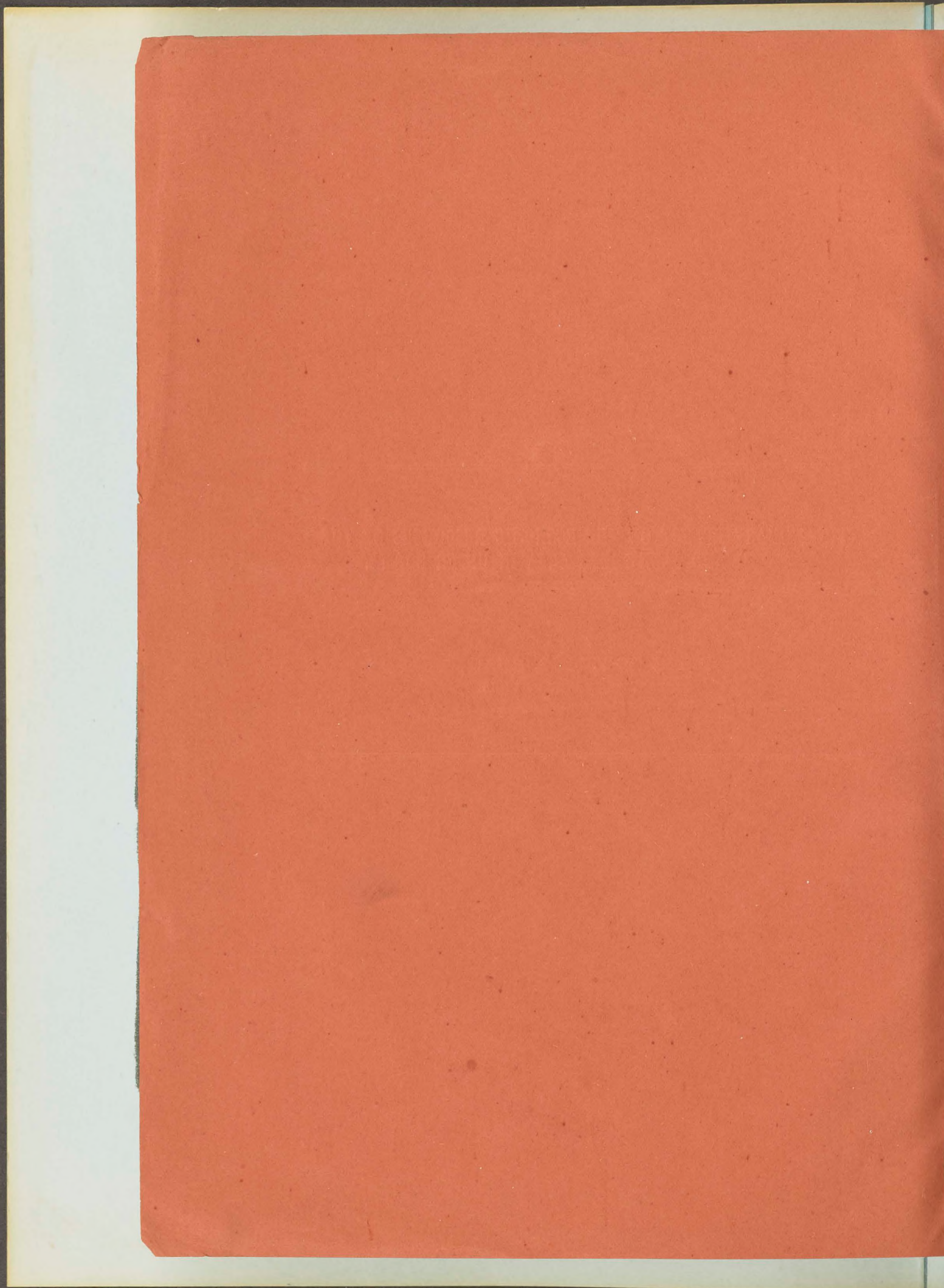
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PRELIMINARY REPORT ON THE ECONOMIC RESOURCES OF THE  
AMBER AND JADE MINES AREA IN UPPER BURMA.

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Preliminary Report on the economic resources of the Amber and Jade mines area in Upper Burma, by FRITZ NOETLING, PH.D.,  
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The amber-mines which were examined by me are situated about 5 miles to the south-west of the village of Maingkhwan on a low isolated hill, which rises abruptly from the surrounding plains.

Situation of the mines.

Amber. There is no doubt that this hill, which has an elongated shape, the main axis running N.E.-S.W., formed part of a formerly wider extended river terrace, which has, however, been considerably denuded and worn away during the process of time. It is therefore *a priori* not improbable that amber may be found also at other localities in that part of the country near the Nangotiemaw hill. I was subsequently informed that the amber-mines proper—that is to say, those which at present produce the amber—are situated west of, and are close to, a village called Lalaung.

The strata in which the amber is found belong to the tertiary formation, probably to the lower miocene. The exact age cannot be stated yet, as no fossils have so far been discovered. The amber-bearing beds consist of a soft, blue clay, which is superficially discoloured brown, the discolouring being apparently due to the disintegrating action of organic acids formed by the extremely rich vegetation; and it may therefore be expected that the brown portion of clay forms only a thin covering of varying thickness on the exposed parts of the blue clay. It might further be anticipated that the amber found in this clay, being also under the influence of the chemical process which discoloured the clay, would be of inferior quality to that which is extracted from the blue clay. The experimental shafts sunk by me have proved that both these views are correct.

Geology.

The clay is well stratified, and it reminds me very much of the blue, coal-bearing clay of the Chindwin coal-fields. The strike is N.W.-S.E. with a dip of 80° towards west. It was impossible to ascertain whether amber is found all throughout this clay, but I rather doubt it. If we may judge from the extension of the old pits, which are chiefly on the top and the western slope of the hill, the amber is limited to the upper part of the blue clay. This view being correct, the amber would be found in a bed of highly inclined strata forming a broad band along the western side of the Nangotiemaw hill running in N.W.-S.E. direction. The continuation of the bed to the south will strike the supposed amber-mines at Lalaung.

It may be well to keep in mind that amber is nothing but a kind of resin which has been produced in exactly the same way as resin is produced by the trees now-a-days, only that the amber-producing trees—pine trees very probably—were extremely rich in resin, and that the process of production went on during tertiary times. The hardened resin accumulating in the amber-pine forest during the course of centuries was gradually washed away by the rains, and being of low specific gravity, easily floated down in the rivers to the sea, which then covered the whole of Upper Burma, where it was again deposited here and there. The amber deposits were covered with clay, the deposit of the sea, and this process may have been going on for a long period till the amber-bearing strata, as they present themselves in their present thickness of not less than 600 feet, had been formed.

It is therefore easily understood that the amber will be found in isolated pockets of



smaller or greater extension and thickness, but once one of these pockets is exhausted the miner will have to look for another one, which may not be indicated by superficial signs. The native style of extracting the amber, to which I shall refer presently, must therefore be a highly speculative undertaking, as it merely depends on luck whether the workmen will strike an amber-bearing pocket or not.

The amber is found in lumps of various sizes up to the size of a man's head; these are either rounded or more frequently flattened, having exactly the same shape as the pebbles on a beach, thus proving that they have undergone a considerable amount of wear and tear before they were deposited.

The amber: its colour and value.

The colour of the amber varies from light yellow to dark brown, in all shades and various degrees of transparency, the most common colour being a dark reddish-brown, which may very well be compared with the colour of dark Madeira wine. Specimens of this kind are nearly always flawed, and contain streaks of minute fragments of wood. Transparent pieces are of a more reddish colour. The colour most valued by the natives is honey-yellow; larger pieces of this kind are rare. The milky-white, cloudy coloured variety, such as is at present particularly appreciated in Europe, does not occur in the Burma amber.

The Burmese amber is further more distinguished by one peculiarity which would lower its value in the European market; this is its fluorescence. This is the bluish tinge which appears when looked at under a certain angle, which is sometimes so strong that fine yellow pieces appear of an ugly greenish colour.

The amber is extracted in the most primitive fashion. No surface indications reveal the presence of a pocket of amber; the selection of a spot where mining operations are going to be started is perfectly accidental. Having selected a spot, a man digs a square hole of about  $1\frac{1}{2}$  feet by 2 feet by means of a rude tool, which resembles the Burmese taywin, that is to say, a short chisel-shaped iron affixed to a heavy wooden club-shaped handle. With this instrument the soft clay is loosened, and by means of a rough wooden shovel thrown into a bamboo basket, (both made on the spot) and hauled up by means of a long bamboo. In this way the miner digs himself gradually into the clay, constructing a chimney-like pit which just affords room enough for one man to work in. If an amber-bearing pocket is reached, which may be found at any depth, it is worked, and if of some extension, other pits are sunk around the original one until all the amber is extracted by working from one pit to the adjoining ones. As it happens frequently enough, no amber is found; then the pit is abandoned and another spot selected. It is perfectly clear that under this system of extraction the output solely depends on luck; one man may find a large quantity, while another works for weeks without getting more than a few pieces.

I was of course obliged to accept the native method, but all I can say is that I

My experiments.

was extremely unsuccessful. Although I sunk about six shafts, which I worked with sometimes nine coolies at a time for nearly a fortnight, the whole output consisted of a few small pieces of disintegrated amber worth nothing. This may not be very encouraging, but in my opinion it is absolutely no sure test as to the value of the amber-mines; experiments to this effect must be carried out on a larger and more systematic scale and over a longer period.



Although I have no doubt that amber is found in large quantity either at Lalaung or elsewhere, it may safely be said that it will never form an article of export to Europe unless the fashion changes. The two qualities which are against it finding a market at home are, first, its colour; second, is fluorescence.

As regards the colour, only the milky white clouded pieces of amber command at present a considerable value in the European market; all the other colours yellow and red, in their various degrees of transparency, are of inferior value, and would hardly be appreciated in Europe. Burmese amber would therefore range in the second place as long as the fashion does not change, and it is still more lessened in its intrinsic value by the fluorescence which is never found in European amber. Only amber from Sicily shows the same peculiarity, and although found in some quantity, it is for this very reason practically unsaleable.

There is another reason why the fluorescence will be fatal to the Burmese amber. Up to only a very recent date the firm of Messrs. Hantien and Beeker in Königsberg, who are owning the monopoly of the Prussian amber-mines, which are the chief amber-producers, had every year an enormous quantity of refuse amber which could hardly be disposed of; the only way of utilising it being the manufacture of varnish, and as there is only a limited demand for such varnish, large quantities of the refuse were every year stored away. Some years ago the problem of smelting the amber was solved; the process consisting in softening the amber by steam under high pressure and then compressing the mass by hydraulic pressure. The amber thus produced resembled in colour the yellow or brown variety, its only difference from the natural pieces being its fluorescence. The firm, stopped the manufacture of this artificial amber because large pieces of it could be produced at such a low cost price that if thrown on the market it would have soon cut out the inferior qualities of natural amber altogether. The firm, rather than be its own competitor, stopped the manufacture of smelting the refuse altogether, and the storage of the latter is still going on. There is, however, no doubt that the very moment the Burmese amber, which in its physical qualities is similar to the amber produced by smelting the refuse of European amber, would appear on the market as a serious competitor to European amber, the firm would at once take up the manufacture of artificial amber.

It may therefore be foretold with every certainty that if any company which might in the future exploit the amber-mines were not satisfied with supplying the local and China market only, but were to begin to export to Europe, it would find great difficulty in competing against German production; and it may even be doubted whether it would succeed in doing so, owing to the undoubtedly inferior quality of the Burmese amber. But whether the local demand, which may be estimated at about 2,000 viss per year at the outside, will be sufficient to pay a European company remains still to be seen.<sup>1</sup>

In conclusion, I would recommend that experiments on a larger scale should be carried out either at Lalaung or elsewhere with a view to ascertain whether there exists a sufficient quantity of amber to pay a more systematic mode of working.

<sup>1</sup> Dr. Noetling lays perhaps too much stress on the unfavourable appreciation which Burma amber may obtain in the European market. Its great area of sale is in the East, where it will probably hold its own against the European product.—*Ed.*



The so-called Mogaung coal-field might be more properly called Saungka coal-field, the outcrops of the seams being situated along the bank of a small stream of this name. The Saungka chaung is a feeder of the Mogaung stream, which it joins about 16 miles above Mogaung, running down from the hills on the right bank of the river. The coal seams are said to be found about 5 miles to the west of the banks of the Mogaung river. Although I did not visit the locality itself, I may venture a few remarks as to its probable value because I examined the country on both sides of the hills which contain the coal. There is no doubt that the coal is of tertiary age; the hills to the east consist, however, of metamorphic rocks, while those to the west consist of crystalline limestone, which probably sweeps round the northern side of the tertiary sandstones. To the south the latter are covered up by the alluvial plains of Mogaung. We can therefore safely say whatever may be the thickness of the seams, their extension is very limited, and it is further highly probable that the strata are very much disturbed.

Note on the Mogaung coal-field.

Two different groups of mines may be distinguished, which we may call the pit and quarry mines, respectively. The pit mines are situated along the bank of the Uru river, beginning at about Sankha village and extending for a distance of about 40 miles further down. The quarry mines near Tammaw village are situated about 8 miles to the west of Sankha village on the top of a plateau rising to about 1,600 feet above the level of the Uru river.

Preliminary report on the Jade-mines. Situation of mines.

Although it is quite probable the mineral which is commonly called jade and which forms the object of an extensive industry in the Mogaung sub-division is different from the jade proper, I may be allowed to use the old name till chemical and microscopical analysis will have revealed the true nature of this mineral. The Tammaw mines afford the best opportunity for the study of the geological condition under which the jade is found. It here forms a vein of considerable thickness in an igneous rock of blackish green colour. The jade is a purely white crypto-crystalline mineral much resembling the finest marble, containing here and there green specks of various sizes, which form the jade proper. The jade vein is separated from the black rock by a band of a soft and highly decomposed argillaceous mineral. The strike of the vein is approximately north to south, and the dip at about an angle of  $20^{\circ}$ , varying considerably towards east.

Geology.

It is difficult to determine the age of these igneous rocks. Before Sankha is reached a similar rock may be seen breaking through tertiary sandstones, but unfortunately the relations of the Tammaw trap to the surrounding strata cannot be observed owing to the denseness of the jungle.

The jade extracted from the pit-mines is found in the shape of boulders, which are undoubtedly derived from localities hitherto unknown, in the neighbourhood of the Uru river. It is probable that this kind of jade, which has undergone a considerable amount of wearings much harder, and therefore of better quality, than the jade extracted from the quarry mines, which has hitherto only laid open the outcrop of the vein; but there is no doubt that once the mining operations have reached a greater depth, where the jade has no longer been subjected to the superficial disintegration, a material will be found which, if not better, will at least be equal to the jade extracted from the pit-mines.



There are at least 500 men engaged every season in working the quarry-mines at Tammaw. The mining operations are carried on in the Mining operations. rudest fashion. No blasting powder being available, the rock is heated by large fires, and having again cooled down, is broken into pieces by means of enormous iron hammers.

The operation in the pit-mines are less difficult as the alluvial gravel in which the jade boulders are found does not require the tedious process of heating the rock. The miner simply digs a pit and selects the boulders from the stuff dug out of the pit; good pieces of jade are sometimes found in the laterite, which forms beds of varying thickness along the Uru. These pieces have superficially undergone a certain discolouring in such a way that the original green or white is changed under the influence of the hydrated oxide of iron into a dark red colour. Specimens of this kind are generally known as "red jade."

There is no doubt that the jade-mines, especially the jade vein of Tammaw, forms a most valuable property; and there is further no Value of the mines. doubt that, besides the Tammaw jade vein, others will be discovered sooner or later, as we know now that jade is intimately associated with a dark igneous rock (trap). As the country abounds in rocks of this kind, it may fairly be expected that a closer examination of these rocks, perhaps some extensive prospecting operation, will result in the discovery of other jade-mines.



There are at least four main groups of jade in the country, and the jade of each group is of a different color. The jade of the first group is of a light green color, and is of a soft texture. The jade of the second group is of a dark green color, and is of a hard texture. The jade of the third group is of a light green color, and is of a soft texture. The jade of the fourth group is of a dark green color, and is of a hard texture. The jade of the first group is of a light green color, and is of a soft texture. The jade of the second group is of a dark green color, and is of a hard texture. The jade of the third group is of a light green color, and is of a soft texture. The jade of the fourth group is of a dark green color, and is of a hard texture.



